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New Striped Tree Squirrels from Burma and Thailand

BY JOSEPH CURTIS MOORE

In the process of revising the striped tree squirrels of the oriental genus *Tamiops*, the writer finds that a geographic area including parts of Burma, Yunnan, Laos, and Thailand is represented by material of the species *Tamiops maclellandi* in the American Museum of Natural History and the United States National Museum that differs from any of the named subspecies. Dr. David H. Johnson, Curator of Mammals at the latter institution, permitted me to study the *Tamiops* material there, and to include comment on it in the following description.

Tamiops maclellandi collinus, new subspecies

TYPE: A.M.N.H. No. 163528, an old male from Maymyo, 800 meters elevation, upper Burma, taken November 28, 1937, by Gerd Heinrich, latitude 22° 05' N., longitude 96° 30' E.

RANGE: Upper Burma east of the Irrawaddy River and south of Bhamo, adjacent western Yunnan, extreme northern and northeastern Thailand, and adjacent Laos at least as far east as Vientiane. It doubtless intergrades with typical *maclellandi* north of Bhamo and west of the Irrawaddy River. The *maclellandi* material from Mt. Victoria suggests this intergradation in dorsal, although not ventral, aspect. Somewhere in southern Yunnan *collinus* doubtless intergrades with *inconstans*. On the Mekong plain in Thailand it is probably replaced by the species *rodolpheii*. No doubt it intergrades with the redder subspecies *barbei* about at Toungoo, Burma, as it does with the paler, grayer *kongensis* in northern Thailand.

DESCRIPTION: The type series has agouti crown, nape, sides, and

legs about Buffy Brown¹; feet buffier than legs; middle dark dorsal stripe black and 4–5 mm. wide measured at the widest part; paired inner dark stripes blackish agouti and 5–7 mm. wide; inner light stripes Honey Yellow to Isabella Color and 3–4 mm. wide; outer light stripes Cartridge Buff to Cream Buff and 6–7 mm. wide; ventral pelage gray-based and tipped with Light Ochraceous Buff to Ochraceous Buff; tail but slightly distichous; tail hairs with whitish tips, subapical 3-mm. black bands, Warm Buff to Ochraceous Buff 2-mm. bands, and blackish bases.

DIAGNOSIS: Outer pair of light stripes broader (5–7 mm.) and brighter than those in *T. m. mccllellandi* (3–4 mm.), and venter generally brighter and more yellow-orange than the cream or pale buff venter of *mccllellandi*. Stripes even more markedly bright and broad than those of *inconstans*. Crown, nape, and sides darker agouti than in *kongensis* (Buffy Brown compared to Drab). Width of outer light stripes in *kongensis* (7–12 mm.) generally exceeds that of *collinus*. Dorsal pelage of *collinus* lacks the general reddish infusion of *barbei*, the outer light stripes being, respectively, Pale Ochraceous Buff and Salmon Color. The ventral pelage of the *collinus* is much yellower than the Vinaceous-Tawny of *barbei*.

MATERIAL: Maymyo, 800 meters, Burma, topotypes (A.M.N.H.), 14; Mengting, 1700 feet, Yunnan (A.M.N.H.), four; Mu-cheng, Salween drainage, 5000 feet, Yunnan (A.M.N.H.), two; Sawan Mountain, Ban Seid, Loey, Thailand (U.S.N.M.), one; Lomloe Mountain, Ban Maeo, Goksatawn, Loey, Thailand (U.S.N.M.), eight; Vientiane, Laos (U.S.N.M.), five; Chiang Saen Kao, Chiang Rai, Thailand (U.S.N.M.), one.

MEASUREMENTS: Body measurements are shown in table 1 and skull measurements in table 2. Parous condition, and hence the adulthood of females, is here distinguished by the enlarged and blackened nipples evident on the dry skins. Males are here considered adult if the molars are visibly worn. Individuals with permanent upper premolars but no tooth wear are called subadults, and those with deciduous upper premolars are listed as immatures. While the maxillary tooth row is as large in subadults as in adults, it is evident that other characters are not, and that this maturity distinction is justified. This demonstrates the need of using only skulls showing tooth wear in taxonomic comparisons in *Tamias*. As this species has generally been

¹ Capitalized color names are from Ridgway (1912).

TABLE 1

MEASUREMENTS (IN MILLIMETERS) OF *Tamias maclellandi collinus* TYPE SERIES, TAKEN IN FIELD BY COLLECTOR

A.M.N.H. No.	Date	Head and Body	Tail	Hind Foot ^a	Ear	Sex	Maturity ^b
163528	Nov. 28, 1937	125	113	28	11	♂	Adult
163529	Nov. 28, 1937	112	58	28	11	♀	Parous
163530	Nov. 30, 1937	116	111	28	11	♀	Parous
163531	Nov. 30, 1937	115	80	28	11	♂	Subadult
163532	Dec. 3, 1937	118	110	28	11	♂	Adult
163533	Dec. 3, 1937	112	111	28	11	♂	Subadult
163534	Dec. 3, 1937	116	106	28	11	♂	Subadult
163535	Dec. 4, 1937	105	105	28	11	?	Immature
163536	Dec. 6, 1937	118	111	28	11	♂	Adult
163537	Dec. 7, 1937	108	104	28	11	?	Immature
163538	Dec. 8, 1937	121	55	27	11	♀	Parous
163539	Dec. 8, 1937	118	123	27	11	♂	Subadult
163540	Dec. 9, 1937	118	107	27	11	♂	Adult
163541	Dec. 18, 1937	104	77	28	11	♂	Subadult
163542	Dec. 21, 1937	107	107	28	11	♂	Immature

^a Without claws.

^b See text for explanation of terms.

TABLE 2

SKULL MEASUREMENTS (IN MILLIMETERS) OF SEVEN ADULTS AND FOUR SUBADULTS, IN THAT ORDER, OF THE TYPE SERIES OF *Tamias maclellandi collinus*

A.M.N.H. No.	Greatest Length of Skull	Zygomatic Breadth	Condy- lobasal Length	Palatal Length	Maxillary Tooth Row	Greatest Length of Nasals
163528	33.1	20.6	30.3	15.4	5.2	9.1
163529	—	20.1	—	15.7	—	9.4
163530	—	—	—	15.3	5.4	8.9
163532	—	—	—	14.9	5.3	—
163536	32.5	19.8	29.1	14.9	5.1	9.1
163538	32.7	—	—	—	5.3	9.2
163540	33.0	20.1	30.0	15.6	5.3	8.9
163531	32.4	—	—	—	5.3	8.8
163533	31.8	19.5	28.5	14.6	5.3	8.8
163534	32.1	19.0	28.9	14.9	5.3	8.6
163539	—	19.7	—	—	—	8.7

collected with shot, and the skull is fragile, skulls that are of mature animals and are whole are unusually scarce. No difference is found between nine *T. m. maclellandi* from northern Burma (Mansum, Moklok, Dalu, Tagahka, Haibum, and Kaungheim) and *T. m. collinus* in the six skull characters given in table 2.

Robert E. Elbel, who collected mammals in various parts of Thailand from 1951 to 1954, is perhaps the first to venture for such work into the eastern part of Thailand. This is the relatively arid plateau 250 miles in diameter which is partially embraced by a great bend of the Mekong River. Elbel penetrated the northwestern quarter of the area and obtained a collection of mammals from the Chaiphum and Konkaen Provinces. Dr. David H. Johnson, Curator of Mammals of the United States National Museum, called to the writer's attention a brightly colored series of the little striped tree squirrel *Tamias* from the Elbel collections which quite evidently represented a new subspecies. Dr. Johnson considerably made this series and some personal notes on it available to the present author to describe.

***Tamias rodolphi elbeli*, new subspecies**

TYPE: U.S.N.M. No. 294876, adult female, skin and skull, collected by Robert E. Elbel on January 18, 1952, at village of Ban Lad, Pookeio District, Chaiphum Province, Thailand (ca. latitude 16° 40' N., longitude 101° 45' E.).

DIAGNOSIS: *Tamias rodolphi elbeli* is distinguished from all subspecies of *Tamias maclellandi*, *swinhoei*, or *maritimus* by the mid-dorsal black stripe, for this stripe is divided at least part of its length by a fine line of yellowish brown down its middle. It differs from *Tamias rodolphi rodolphi*, which occurs to the east and south of it, in the brilliance of its Isabella Color crown and nape compared with the Buffy Brown (pl. 40) to Snuff Brown (pl. 29) crown and nape of *T. r. rodolphi* (including three virtual topotypes from Bien Hoa, Cochin China).

PELAGE COLOR: The crown and nape are between Isabella Color and Honey Yellow but closer to the first. The ears are gray with black tufts on their backs tipped with white. There are four dorsal light stripes almost equally white, equally spaced apart (circa 5 mm.), and equal in width (circa 3 mm.). The inner pair is Cartridge Buff and the outer pair slightly whiter, or occasionally both pairs are whiter and equally white. The outer pair of light stripes is finely edged with orange-yellow on the outside. Both pairs of light stripes extend from the shoulders onto base of tail, but the outer pair continues forward, at least faintly,

across the shoulder to merge dimly with the obsolescent light facial stripe. Three dark dorsal stripes separating the four light ones are continuous with the nape but posteriorly change to Buckthorn Brown and progressively to Mummy Brown. About 5 mm. wide on the back, they become narrower over the rump, and reach the base of the tail. The Mummy Brown or the dark middorsal stripe is divided down the middle by a line of Buckthorn Brown. The sides are neutral gray posteriorly but become lighter and faintly infused with yellow anteriorly. The venter is Cream Buff from the tips of the hairs on the throat and breast, but on the abdomen the Slate Gray of the bases of the hairs shows through more, and the tips are only about Cream Color. The hairs of the narrow and indifferently distichous tail have white tips, a long subterminal black band, a long buffy band, and a short blackish base, except at the extremity of the tail where the tips are usually very long and black, but may be very long and mixed black and white, producing a gray tuft. All four feet are about the color of the crown or a little grayer or paler in some specimens. The legs are concolorous with the sides.

SKULL CHARACTERS: The skull measurements (in millimeters) of the type are: occipitonasal length, 32.6; condylobasal length, 30.0; right maxillary toothrow, 5.4; palatal length, 15.8; mastoid breadth, 14.9; greatest breadth, 20.1; nasal length, 10.2; orbitonasal length, 13.6.

Of 17 skulls of *Tamiops m. collinus* and *kongensis* examined in the United States National Museum from localities geographically near to *elbeli*, five have the posterior surface of the extremities of the upper incisors beveled so that it shows just a slight concavity in the side view. Each of the other 12 is cut so that it shows a notch. Of 13 skulls of *T. r. elbeli* examined, four have just a slight concavity, and nine have a straight bevel. The lateral margins of the basioccipital are curled ventrad and rise slightly to a low point or process in *T. r. elbeli*, but in *T. m. collinus* and *kongensis* and also *T. r. rodolphei* these edges remain low ridges and do not form a point or process.

RANGE: This new race comes from the eastern part of Thailand, the Mekong plateau 2000 feet in elevation, which is subtended on the north and east by the Mekong River and south by the Phanom Dang Raek, a range of mountains. Excepting for Gyldenstolpe (1916) who collected mammals on its southwestern edge about Korat, evidently no mammalogist had collected on this plateau before R. E. Elbel got into the northwestern quarter of it. The material representing *Tamiops r. elbeli* all comes from Chaiyaphum Province and Khonkaen Province. None of the villages which Elbel recorded as localities of his col-

lections appear on the 1:1,000,000-scale, 1944 maps of this area, but as Elbel plotted them on his road map, Ban Lad appears to be 5 kilometers north of Ban Non, which we presume to be his Ban Non Toulek. Both are in the Pookeio portion of the province.

Eight specimens from Ban Maeo, Loey Province, to the north-north-west and five specimens from Vientiane to the north-northeast are referable to *Tamiops maclellandi collinus*. Other *maclellandi* material from west of the range of the new species is all from west of the Yom River. The *T. r. rodolphei* material examined is from Chonburi, Rayon, Chantburi, and Trat provinces in extreme southeastern Thailand (southeast from Bangkok) and from Cambodia, Cochin China, and southern Laos. There is no definite evidence of intergradation between these and the new subspecies, although the rather bright specimen of *T. r. rodolphei* in the United States National Museum from the forests of Banteai, near Angkor, Cambodia, faintly suggests this. Much remains to be discovered about the distribution of the new form, but it may occupy most of the area of the eastern plateau of Thailand.

BODY MEASUREMENTS (IN MILLIMETERS): Field measurements of the total length, tail length, and hind foot of the type of *T. r. elbeli* are, respectively, 250, 130, and 30. The same characters recorded for a male and two females of *T. r. elbeli* from Ban Non Toulek are, respectively: 220, 250, 220; 110, 129, 102; and 30, 32, 30.

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